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Evaluation of a home response system for the elderly

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EVALUATION OF A HOME RESPONSE SYSTEM FOR THE ELDERLY

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ABSTRACT

EVALUATION OF A HOME RESPONSE SYSTEM FOR THE ELDERLY

By Nancy N. Hikoyeda

The Companion for Life (CFL) home response system is a technological device designed to help vulnerable, elderly individuals to live independently. This descriptive study explored CFL subscriber perceptions and utilization to examine the system's influence on independent living.

Forty-six subscribers participated in telephone interviews. Modifying variables, including payment systems, functional status, social services, and social support networks, were examined to assess their influence on subscriber perceptions.

The results indicate that participants perceive CFL to be very effective in enhancing their ability to live independently because it provides 24-hour emergency assistance and psychological benefits. Examination of the modifying variables suggest several significant differences in satisfaction and utilization. Further research was recommended to assess CFL's effectiveness as an intervention designed to facilitate independent living for elders.

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CHAPTER 1

INTRODUCTION

The ability to live independently is important for the health and well-being of individuals as they grow older. This ability affects not only older persons, but their families and communities.

Interventions which assist elders in maintaining independent living require careful planning and evaluation. Home response systems are technological interventions designed to facilitate independent living. One such intervention, "The Companion for Life" home response system, was examined to explore the system's influence on independent living for elderly subscribers.

Purpose

The purpose of this research was to examine subscriber perceptions and actual utilization in order to assess the effectiveness of Companion for Life (CFL). Additionally, comparisons were made among subscribers with different payment systems, functional status, social services, and social supports networks to determine their effects on subscriber perceptions and utilization.

Statement of the Problem

Elders over the age of 65 are the fastest growing segment of the population. In 1985, over 28.5 million people were over 65 in the United States and this figure is expected to grow to 64.6 million by the year 2030 (U.S. Bureau of the Census, 1985). Since 1900, life expectancy has increased from 46.4 to 71.2 years for males and 49.0 to 78.2 years for females (National Center for Health Statistics, 1984).

Many older people become frail and vulnerable as they age. Approximately one-third of all elders live alone--41% of older women and 15% of older men (U.S. Bureau of Census, 1983). Elders have a higher incidence of sickness and death from acute illnesses (Yoshikawa, 1981). Long-lasting chronic medical conditions often cause irreversible physiological changes which interfere with daily activities. In 1980, 17 million people over age 65 experienced limitations in activity. This number will more than double by the year 2030.

By the year 2000, 3.8 million people will be over the age of 85 and half of this group will require long-term care. Public and private expenditures for long-term care are high. In 1975, federal, state, and local governments spent nearly $5.8 billion, with almost $5.2 billion for

institutions, including nursing homes; private expenditures totaled between $5.9 and $7.7 billion (Congressional Budget Office, 1977). Despite the enormous expenditures, institutionalization is usually considered the least desirable, last resort for elders in need of long-term care.

Concern for personal safety and security is also rising. Accidents constitute the seventh leading cause of death among elders (National Center for Health Statistics, 1986). Although elders are not victimized more than other age groups, they tend to have a greater fear of crime (Norton & Courlander, 1982).

A number of technological devices such as home response systems have been developed and are available to address the needs of vulnerable elders. Home response systems are presumed to aid independent living by providing clients and caregivers with affordable emergency assistance and physical and psychosocial benefits which help prevent or delay institutionalization. Little is known about the effectiveness of home response systems even though the technology is being actively marketed. The "Companion for Life" home response system was examined to determine the system's effectiveness and influence on independent living.

The Companion for Life

"The Companion for Life" (CFL) is a home response system for older persons. The Council on Aging of Santa Clara County, Inc. has been the broker for the CFL program since 1986 and has approximately 150 subscribers. The system provides 24-hour monitoring and alerts central responders to medical or other emergencies which subscribers may encounter. CFL is designed to provide a significant, affordable contribution to independent living for elders and their families. The system seeks to reduce the risks of living alone and diminish family and caregiver concerns, thereby helping to prevent or delay institutionalization.

Three levels of service are offered by the program: (1) "Basic Companion Service" consists of a console and remote control "call" pendant; (2) "Call Light 330 Service" includes the basic service and a "patient-down" automatic call in the event of loss of consciousness; and (3) "Companion-Voice Service" consists of two-way, voice-to-voice communication with console, remote pendant and a social component. The latter feature encourages use of the system for purposes other than emergencies (e.g., socialization or supervision).

Units are connected to subscriber telephones. Activation of the portable transmitter (pendant) signals a central

responder to a potential emergency situation. When Level 1 and 2 units are activated, central responders first telephone subscribers. If there is no response, predetermined emergency "support" people are called who answer the responder's alert and render necessary assistance. Upon activation of a Level 3 unit, responders attempt to communicate directly with subscribers through the two-way, voice-to-voice console. Support people are called if subscribers do not respond or if subscribers request assistance.

The program has two types of subscribers: those whose systems are funded by the Multipurpose Senior Services Program (a Medicaid waiver program sponsored by the Council on Aging) and those who pay privately. These groups are referred to as "MSSP" and "private" subscribers, respectively.

MSSP subscribers are certifiable for care in a skilled nursing or intermediate care facility and eligible for a comprehensive case management and services package to meet medical, psychological, and environmental needs. MSSP criteria for CFL include general frailty, susceptibility to falls or dizziness, and/or social isolation. Very frail or confused subscribers only need to know that they must push a button to access help. MSSP case managers recommend Basic

Companion Service (Level 1) or Companion-Voice (Level 3). Basic Companion Service is recommended for the hearing impaired or those otherwise unable to use Companion-Voice effectively. Case managers prefer Companion-Voice because of the provision of direct communication and socialization.

There are no qualifying criteria for private paying subscribers. The units are rented on a month-to-month basis. The rates vary for different service levels from $18.00 a month for Basic Companion Service to $25.50 for Companion-Voice.

Objectives and Research Questions

Objectives

This study was designed to meet the following objectives:

1. To evaluate the effectiveness of the Companion for Life home response system.

2. To determine subscriber perceptions of the ways in which home response technology enhances independent living.

3. To provide baseline data for future CFL and home response system studies.

Questions

1. What is the effect of the Companion for Life home response system on independent living for elderly subscribers?

2. Is there a relationship between payment source and utilization or perceptions of CFL's influence on independent living?

3. Is there a relationship between functional status and subscriber perceptions or utilization?

4. Is there a relationship between use of social services and perceptions or utilization?

5. Is there a relationship between frequency of contact with social support networks and subscriber perceptions or utilization?

Operational Definitions

Companion for Life (CFL): The home response system sponsored by the Council on Aging of Santa Clara County, Inc.

Subscribers: Individuals 60 years of age or older who have a CFL unit in their home. For the purposes of this study, all subjects had Level 3, Companion-Voice units.

Independent living: Living in the community. Individuals may utilize social supports and/or social services to facilitate and maintain the basic life tasks required for independent status. In this study, independent living was the dependent variable.

Payment systems: The two methods of paying for CFL units: (a) private payment (private) or (b) units fully subsidized by the Multipurpose Senior Services Program (MSSP).

Functional status: Measures of two functional abilities: (a) the physical abilities necessary to perform selected Activities of Daily Living (ADL) as listed in the standardized ADL index (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963; Linn & Linn, 1984); and (b) Instrumental Activities of Daily Living (IADL) as reported by Lawton (1971). Specific ADL components in this study were bathing and dressing. Specific IADL's included: shopping, housekeeping, traveling, managing finances, and walking.

Social services: Formal agency or organizational assistance employed to assist older persons in performing the routine tasks needed for independent living. The social services of this study included: homemakers, home delivered meals, transportation services, friendly visitors, telephone

reassurance, adult day services, legal assistance, personal and family counseling, and respite care services.

Social support networks: An elder's social relationships. The networks may be informal (e.g., family and friends) or formal (e.g., social welfare agencies, neighborhood, church, or senior citizen's groups). In addition to socialization, they may also provide some form of assistance. In this study, social support networks were measured by self-reported frequency of social contacts.

Assumptions

The researcher made several assumptions relative to this study. First, the ability to live independently was assumed to be beneficial for elders. The rationale for this assumption is discussed in the literature review. Second, the researcher assumed that the elderly respondents, including those who were very frail, were able to understand the questions and answer them candidly and accurately. Respondents were believed to be telling the truth and were not intimidated or fearful of adverse consequences as a result of their participation in the study. Finally, the telephone interview data collection method and measures of the activities of daily living, social services, and social support

networks were assumed to be appropriate for the assessment of subscriber perceptions and utilization.

CHAPTER 2

LITERATURE REVIEW

Home Response Systems

Research regarding home response systems, their use by the elderly, and their influence on independent living is limited in the literature.

Several studies have examined similar technologies. Wolf-Klein and Silverstone (1987) evaluated a hot-line emergency telephone service for frail, ambulatory patients under treatment at a geriatric health center. The service, which operated when the clinic was closed, was designed to prevent unnecessary emergency room visits and hospitalizations. Patients, caregivers, and staff reported that continuous access enhanced medical care delivery, which led to greater satisfaction with the center.

In Scotland, McWhirter (1987) surveyed over a hundred general practitioners regarding the usefulness of radio alarm and pull cord systems. The 24-hour emergency services were designed to help frail, disabled elders to remain at home, to avoid or delay hospital admissions, and to facilitate hospital discharge. In private housing, the radio alarm was similar to CFL Basic Companion Service.

Sheltered housing systems were activated by pull cords. Activation of the switch, remote control, or pull cord alerted operators who then used radio telephones to direct mobile wardens to client homes. The physicians felt the system delayed hospital admissions. The emergency and social components were considered effective in helping frail elders to remain in the community. McWhirter recognized the absence of measures for goals such as "decreased institutionalization."

Garrow (1976) evaluated a night emergency service which was installed to facilitate independence for 400 elders living in congregate housing. Pull cords were placed in bathrooms, bedrooms, and living rooms. The cord activated a light above the door which opened the lock, rang a bell in the hall, and alerted an emergency team. The emergency service was believed to be so successful that it was recommended for all housing projects in the area. However, Garrow noted a disturbing finding; for whatever reason, not all residents called when in need and had to be reminded about the availability of the service. The system's effect on clients was not addressed.

Koch (1984) attempted to demonstrate the importance of the "Lifeline" home response system for hospital discharge planning. Lifeline units were similar to CFL Basic

Companion Service. The 22 elderly subjects did not require hospitalization, but were at risk if sent home due to inadequate family or community support or other personal threats. After 17 months, physicians, social workers, patients, and families felt the system provided an alternative to institutionalization; hospital utilization was more effective; and hospital dependency was reduced. Satisfaction with the hospital also increased. Patients and their families reported an increased sense of safety, security, and peace of mind. Koch felt the systems were also cost-effective when incorporated into hospital discharge planning services. The study had two limitations: the limited sample and the need for further research on the effect of shortened hospital stays.

In England, Brenner (1981) studied alarm systems for a general population of physically frail individuals who were undergoing rehabilitation, prone to sudden emergencies, and housebound. The system was installed to help disabled individuals live independently. The clients expressed an increased sense of security in spite of poorly functioning equipment. The disabled and their families thought the service was extremely effective in enhancing community living.

Gatz et al. (1984) attempted to define how Lifeline technology helped elders by examining four hospital-sponsored systems. Twenty-eight elders were interviewed before or shortly after units were installed, called at three-month intervals regarding emergency and health-related services, and post-tested one year later. A smaller number of family members and neighbors were also interviewed to assess their perceptions of the system's effectiveness. Expected benefits prior to installation included an increased sense of security, emergency assistance when needed, alleviation of family concerns, and increased independence and self-reliance. On post-test, expected benefits were realized; however, one-third felt the system did not change their lives.

The most striking effect of the Lifeline system was on family members who experienced a decreased sense of burden and anger and increased freedom and peace of mind. However, relatives visited or contacted elders less frequently following installation. The system was considered a strong psychological intervention for subscribers and particularly for their families. Elders received an indirect benefit from the psychological support gained by family members; relatives who experienced declines in felt burden became more committed to maintaining elders in the home. The

limited sample permitted only a preliminary report of significant trends.

A three-year Lifeline demonstration study and subsequent substudies were conducted among residents of Boston-Cambridge public housing. The Lifeline technology was comparable to CFL Basic Companion Service with an added component. Clients were to activate a clocktimer at a specific hour each day. The central responder was alerted to a potential emergency (e.g., unconsciousness) if the client failed to set the mechanism.

In the demonstration study, health screeners initially interviewed 2000 residents and identified 355 as potentially in need of an emergency system (Dibner, Lowy, & Morris, 1982). Lifeline was offered to residents at no cost during the three-year period. Sixty-five percent refused the system because they distrusted the technology or housing authority, were afraid of hidden obligations, confused about operation of the system, or afraid the equipment might be stolen. Among those who accepted the system, one-third utilized it during the first year. Subjects were divided into three Target Groups: Group I were severely functionally impaired and socially isolated; Group II were severely functionally impaired and not socially isolated; and Group III were not severely functionally impaired but medically

vulnerable and socially isolated. Upon completion of the project, 134 subjects were interviewed: 88% thought the service was a real benefit; 10% were ambivalent; and 8% (primarily Group III) saw no real benefit.

In another substudy, Jarvis (1978) looked at the utilization of a free social service (Lifeline). The secondary data analysis examined psychological characteristics associated with system acceptance or refusal using the variables of personal dependence, mental health status, and vulnerability. There was a significant difference between accepters and refusers on the personal dependence variable; the former received more formal or informal assistance than the latter. However, subjects were intentionally high risk individuals, which may have influenced the acceptance rate. Jarvis felt because accepters received more assistance, previous experience with social services was a factor in utilization. This finding suggests those who already use various services are more likely to choose a home response system, thereby increasing the potential for overlooking other individuals in need.

Studying the same population, Sherwood & Morris (1980) focused on Lifeline effectiveness and utilization using experimental and control groups, pre- and post-interview design, and multivariate matched pair sampling. Subjects in

the experimental group (primarily Group II) were significantly less anxious and more confident about living alone after the intervention. After the project had terminated, nearly a third of the participants continued the service at their own expense. Those who kept the systems were housebound, more functionally disabled, and had more medical symptoms, stronger support systems, and a positive outlook on life.

A cost-benefit analysis was also reported. Ruchlin and Morris (1981) hypothesized that Lifeline would reduce anxiety and motivate individuals to perform normal activities when alone, reducing the need for institutionalization and community support services. They also hypothesized that physicians and families would support independent living and, if institutionalization was necessary, would support earlier discharge. Generally, the experimental group used fewer medical and social support resources, had significantly fewer acute hospital and nursing home days, and had lower utilization rates for various community services. The Group II experimental subjects, who were severely functionally impaired and not socially isolated, had significant reductions in days of institutional care and community health resources resulting in a benefit-cost ratio of 7:1.

Other researchers cautioned against too great a reliance on home response system technology (Butler, 1981; Butler & Oldman, 1981; Fisk, 1986). Butler contended that home response systems are frequently seen as a panacea for the elderly at risk. In his study of 600 elders in English sheltered housing, alarms were marginally effective and almost the same number failed to use the system as used it during an emergency. He cautioned against unintended or secondary consequences whereby decreased socialization or reduced face-to-face contact could result in possible declines in self-esteem or motivation due to perceived risk or an inability to remain independent. Additionally, Butler felt elderly consumers must actively participate in choosing a system to maximize the benefits (Butler, 1981).

In summary, previous research revealed a number of significant trends:

1. Home response systems were most effective as an emergency service. For vulnerable elders, the 24-hour assistance reduced the risks of living alone.

2. Clients and their families enjoyed psychological benefits such as an increased sense of safety, security, self-reliance, and peace of mind. Psychological benefits were even greater for caregivers than for elders.

3. Hospital and social service utilization was contained. Systems were found to be cost-effective when compared to costs incurred for institutionalization or community services.

4. A number of researchers felt too much faith was placed in home response technology. Home response systems are one of many interventions designed to help elders remain within the community.

A number of limitations in the research are also clear:

1. Researchers presumed home response technology enabled independent living or deferred institutionalization, but there were no measures for these phenomena.

2. The findings were not obtained under "natural" circumstances. High risk subjects were frequently selected because of their impairments or isolation. Additionally, most studies used small samples.

3. The systems had diverse technological features. However, none of the studies reported on the effectiveness of a social component.

The Dependent Variable: Independent Living

For the purposes of this research, independent living has been broadly defined as living within the community.

Two issues help explain the use of this somewhat vague conceptualization. First, there has been no consensus as to what constitutes independent living. The literature regarding independent individuals has used descriptors and predictors for institutionalization rather than an operational definition. Second, factors which help to maintain independent living differ among individual elders. Additionally, researchers do not agree on the components of independent living. Therefore, this study is concerned with the influence of home response systems on independent living based on subscriber perceptions.

Independent living is presumed to be the ideal living situation for most older adults. Most elders prefer to be self-sufficient and live within the community. Furthermore, it is usually less expensive than institutional care. Enormous expenditures of effort and money have gone into support services and programs designed to facilitate independent living. However, the underlying concept must be clarified to effectively evaluate and justify the interventions.

The concept of independent living has evolved over the years. Early rehabilitation studies described independent living in terms of the disabled and the "independent living movement." The movement's proponents claimed the environ-

ment was conducive to the able-bodied, which prevented the handicapped from being self-reliant. Therefore, environmental modifications permitted the disabled to live independently (DeJong, 1979). Historically, independent living movement supporters have fostered ageism for considering only potentially "productive," older adolescents and younger adults as their constituents (Cohen, 1988; DeJong, 1979; Kalish, 1979).

Independent living has also referred to the use of aids for the severely disabled, such as wheelchairs, braces, or special housing (Stoddard, 1980). Tate, Jarvis, and Juhr (1979) characterized independent living as the ability to physically do things alone, to make decisions, and to fully participate in normal daily activities. Their definition was expanded to include the ability to actively share in the pleasures and responsibilities of community life: to work, have a house, and raise a family. More recently, the concept of independent living has been augmented to include the provision for and integration of crisis intervention and on-going support services, and an emphasis on choices, alternatives, and advocacy (Stoddard, 1980). Crewe (1979) has added freedom from isolation or institutionalization.

A broad range of descriptors for independent individuals has been discussed in the gerontological literature.

In the past, it was believed that dependence becomes more apparent and less socially acceptable with increased age. However, self-reliance and independence are believed to increase self-respect and make individuals worthy of the concern and esteem of others (Baltes & Werner-Wahl, 1987). Independence is viewed as a source of pride and a means of avoiding inconvenience to others (Eisler, 1984).

Krivo and Mutchler (1989) felt the ability to live alone was a function of the demographic and normative environment, economic affordability, and available resources. It has also been linked to self-sufficiency achieved with the assistance of formal and informal homecare services when elders become incapable of accomplishing tasks on their own (Stoller & Earl, 1983). Mancini (1984) has defined independence as "well-being" resulting from the ability to care for one's self, make decisions regarding one's own welfare, maintain lifestyle continuity with full participation in social-family relationships, and control over one's life without detachment or isolation from necessary social services.

Institutionalization in a nursing home, hospital, or other facility is usually perceived as the opposite of independent living. Nursing homes have been associated with depersonalization, increased isolation and separation from

society, loss of privacy, forfeiture of civil rights, decreased family relationships, and increased mortality (Bell, 1973). As a result, predictors and risk factors for institutionalization have been examined: elders have been surveyed; caregivers have been assessed to determine their limitations for maintaining elders in the community; and empirical strategies, such as functional rating scales and multiple regression models, have been developed (Grauer & Birnbom, 1975; Jackson, 1985; Shapiro & Tate, 1988; Soldo & Manton, 1985).

The elders most likely to be institutionalized have been portrayed as individuals who happened to be old; those deficient in self-care abilities; those with physical impairments resulting in disability and ADL dependency; elders with mental disorders; those unable to cope with the demands of daily living; and individuals who have experienced a failure or disappearance of support systems or community resources (Bell, 1973; Branch & Jette, 1982; Brock & O'Sullivan, 1985; Knight & Walker, 1985; Smyer, 1980; Zarit, Reever, & Bach-Peterson, 1980). Silliman and Sternberg (1988) have studied family caregivers. Factors which increased burden such as caregiver strain, changes in personal lifestyle, and an increase in functional limita-

tions were predictors if caregivers were the decision-makers for institutionalization.

No one set of variables consistently differentiated nursing home residents from community residents. Linn and Gurel (1972) found the decision for institutionalization to be extremely complex, emotional, and dependent on a number of factors including economics, felt burden, family politics, and availability of institutional care.

Previous studies do not explicitly note how home response systems affect independent living. However, the literature suggests they may enhance independent living in the following ways:

1. Community living is contingent on risk factors such as physical limitations, living alone, or isolation. Home response systems are designed to reduce both actual and perceived risks. The technology provides a support service for crisis intervention which enables vulnerable elders to remain in the community.

2. Home response systems provide significant psychological benefits for clients and caregivers. The emergency assistance enhances both an objective and subjective sense of security and peace of mind.

3. Home response technology is designed to reduce caregiver burden. Ultimately, the degree of burden influences the decision for institutional placement.

4. The technology is intended to be affordable and cost-effective. Costs are relatively low compared to hospital or nursing home care.

The Modifying Variables: Functional Status, Social Services, and Social Support Networks

Although a number of variables affect independent living, the researcher examined functional status, social services, and social support networks. Home response technology provides three specific, potential benefits for independent living: (a) enhanced perceptions of the ability to maintain independent living; (b) utilization for emergencies; and (c) utilization for socialization. The researcher explored the effect of the modifying variables on CFL perceptions and utilization to probe the effectiveness of the technology.

Functional status was assessed because a minimum functional level is necessary for independent living. Individuals unable to maintain the universal activities of biological and psychosocial function have the potential for total dependency on others. However, even with severe

functional impairments, individuals may be maintained in the community with the aid of social support networks and/or social services (Gallo, Reichel, & Andersen, 1988).

The frequency of social interactions was explored to determine its effect on subscriber perceptions and utilization. The social support network is the constellation of an elder's social relationships. Social networks include the social relationships while the social supports are the actual help provided (Gallo, et al., 1988).

Without social support networks, many elders would be unable to remain in the community. Social support networks are necessary for well-being and a source of physical and psychosocial assistance. The greater the social isolation, the more severe the impact of life events and the greater the probability of illness (Stahl & Potts, 1985). Increased social supports alleviate loneliness and worry and augment feelings of usefulness and respect (Quinn, Hughston, & Hubler, 1984). Friends, peers and neighbors--informal, spontaneous, natural supports--serve as role models, increase morale, and help to promote a sense of belonging (Quinn, et al., 1984). Family members are also a major source of assistance (Seelbach, 1984).

Although a broad range of social services is available, their effectiveness is not well-documented. The need for

social services grows as physical impairment increases. For many elders, social services provide the means to achieve self-sufficiency. Community services are also vital to caregivers. They provide assistance for impaired elders and respite for caregivers (Silliman & Sternberg, 1988).

Summary

Although the literature regarding home response systems and independent living was limited, a number of trends were found. The relationship between home response systems and independent living has not been addressed in measurable terms. Client feelings toward the technology remain largely unexplored. However, it has been suggested that home response systems enhance independent living in several ways. They have been found to reduce the risks of living alone. The technology has provided a number of psychological benefits. Reductions in felt burden were even greater for caregivers, which was significant since they often make the decision for institutionalization. Home response systems were believed to be cost-effective when compared to other long-term care alternatives. However, in spite of the advantages, a number of researchers felt too much faith has been placed in home response technology. The systems are

not a panacea for frail elderly but one of many services and interventions designed to facilitate independent living.

There were a number of limitations noted in the research. Specific measures of "deferred institutionalization" and "independent living" were absent. The findings were not necessarily obtained under natural conditions and were primarily the result of demonstration studies using high risk subjects. Finally, the systems examined in the literature were diverse in services and features.

Functional status, social services, and social support networks were found to be important enablers of independence. The degree of impairment, lack of services, and social isolation directly affect independent living.

CHAPTER 3

DESIGN AND METHODOLOGY

Purpose

The primary purpose of this study was to examine subscriber perceptions and utilization in order to assess the effectiveness of the Companion for Life (CFL) home response system. Comparisons were made between subscribers with different payment systems, functional status, social services, and social support networks to determine their influence on the perceptions and utilization.

Questions

1. What is the effect of the Companion for Life home response system on independent living for elderly subscribers?

2. Is there a relationship between payment source and utilization or perceptions of CFL's influence on independent living?

3. Is there a relationship between functional status and subscriber perceptions or utilization?

4. Is there a relationship between use of social services and perceptions or utilization?

5. Is there a relationship between frequency of contact with social support networks and subscriber perceptions or utilization?

Population

The study population (N = 123) included all subscribers of the CFL home response system. Consent to conduct the study was received from the Council on Aging of Santa Clara County (see Appendix A). Approval was obtained from the San Jose State University Committee for the Protection of Human Subjects (see Appendix B).

Research Criteria

The list of current subscribers (N = 123) was obtained from the CFL staff. Clients were classified as either private or MSSP, basic service levels (Levels 1 or 2), or Level 3. There were three times more private than MSSP subscribers in Levels 1 and 2 (26 and 8, respectively). Private and MSSP Level 3 subscribers were comparable (43 and 46, respectively). Twenty-two units had been disconnected (see Table 1). Significant comparisons between different

TABLE 1

Sample Summary

	Payment Systems				
	Private		MSSP		Total
CFL Levels	1-2	3	1-2	3	
	(N = 123)				
Disconnected units	2	9	3	8	22
Not contacted	18	0	0	11	29
Refusals	1	8	2	3	14
Other[a]	0	4	2	0	6
Completed interviews	5	22	1	24	52
Total	26	43	8	46	123

[a]Language barrier, incoherent subscriber, no answer after repeated calls, answering machine/call not returned

service levels were not possible due to the limited number of subscribers in Levels 1 and 2. Therefore, the sample (n = 46) was drawn only from Level 3 subscribers, using systematic random sampling, and consisted of 22 private and 24 MSSP subjects all having Companion-Voice service.

The controlled variables were: age (all subjects were over 60) and type of equipment (all had Level 3, Companion-Voice Service).

The research design was based on descriptive survey methodology using telephone interviews. Telephone interviews were chosen for data collection due to the widespread geographic distribution of subscribers, time restrictions, increased efficiency, and cost-effectiveness. Additionally, this methodology provided a degree of unbiased standardization.

Procedures

Letters of introduction were sent to subjects prior to the interviews (see Appendix C). Subjects were informed of the voluntary nature of the study, low risk, benefits, and confidentiality. Subjects were contacted by telephone and interviews ranged from 15 minutes to over one hour in length.

Sample

Fourteen subscribers refused to participate for various reasons: poor health with an inability to sit long enough to talk; the questionnaire was too long; one respondent hung up with no explanation; another said she had no knowledge of having the system as she was blind; one individual refused to participate because she had never used the system; another indicated she "doesn't like the box because it keeps going off and scaring her"; and one was going to return the unit as she was no longer eligible for MSSP and could not afford it. Six were excluded for other reasons (e.g., language barrier, no answer to repeated calls, no response to message left on answering machine). Two interviews were started but not completed; one subscriber was incoherent and seemed very ill; the other burst into tears, with no explanation, saying she could not go on.

Demographic information was obtained from photocopies of CFL records (see Table 2). Seven subjects (15%) were male and 39 (85%) were female, ranging in age from 62 to 94. Sample dwellings and living arrangements revealed: 83% lived alone; 15% resided with family; and 2% lived with "other." Most private subscribers (95%) lived in single family dwellings including houses, mobile homes, and trailers, while the majority of MSSP subjects (71%) resided

TABLE 2

Sample Demographic Data: Gender, Dwellings, Living Arrangements and Payment Systems

	Payment Systems					
	Private		MSSP		Total	
	n	(%)	*n*	(%)	*n*	(%)
Gender						
Male	5	(23)	2	(8)	7	(15)
Female	17	(77)	22	(92)	39	(85)
Total	22	(100)	24	(100)	46	(100)
Dwellings						
House	17	(77)	5	(21)	22	(48)
Apartment	1	(5)	17	(71)	18	(39)
Trailer/Mobile Home	4	(18)	2	(8)	6	(13)
Total	22	(100)	24	(100)	46	(100)
Living Arrangements						
Alone	17	(77)	21	(88)	38	(83)
Family/Relative	5	(23)	2	(8)	7	(15)
Other	0	(0)	1	(4)	1	(2)
Total	22	(100)	24	(100)	46	(100)

in apartments. The mean age of the sample is shown in Table 3. Self-reported medical conditions were also obtained from client records. The most frequently listed medical problems were cardiac conditions, respiratory ailments, rheumatoid conditions and strokes.

Instrument

A semistructured questionnaire, employing both open- and close-ended questions, was developed to allow depth in responses and an opportunity to probe underlying factors and relationships. The close-ended questions were dichotomous, multiple choice, or rating with some probes. The questionnaire was pre-tested with basic level subscribers and minor modifications were made (see Appendix D).

The 72-item instrument was designed to elicit client perceptions. Queries explored direct perceptions of the system's influence on independent living, the motivation for getting the system, satisfaction, and actual utilization. Other inquiries assessed functional status, social services, and social support networks. At the request of the Council on Aging, additional questions regarding staff training and installation procedures, and suggestions for equipment and program improvements were asked which were not relevant to the current study.

TABLE 3

Sample Demographic Data: Mean Age and Payment Systems

	Payment Systems		
	Private (n = 22)	MSSP (n = 24)	Overall (n = 46)
Mean Age			
Male	81.6	71.5	78.7
SD	8.4	4.9	8.7
Female	77.1	80.4	78.9
SD	6.9	7.0	7.1

Analyses

Categories were developed for the analysis of the open-ended questions based on review of the responses. The responses in each category were then tabulated for the statistical analysis.

Functional Status Measurement

A minimum functional level, which varies with different individuals, is necessary for independent living. The more functional capabilities are impaired, the more interventions are required to maintain community living.

Two indices were used to assess the functional status of CFL subscribers: (a) a modified version of selected Activities of Daily Living (ADL), a standardized index of biological and psychosocial function, used to assess physical independence (Katz et al., 1963; Linn & Linn, 1984); and (b) the Instrumental Activities of Daily Living (IADL), which measures tasks that need not always be satisfactorily performed but still allow independent living (Lawton, 1971). These indices determine whether individuals perform tasks independently, semi-independently, or are totally dependent on others for assistance.

The assessed ADL were bathing and dressing; assessed IADL included shopping, doing housework, traveling, handling finances and walking. The ADL's of toileting, continence, and feeding were omitted out of respect for the privacy of the subjects as those activities were highly personal and not absolutely necessary for the purposes of this study. Responses were scored as follows:

0 = ability to do the activity without help

1 = need for assistance (mechanical, personal, or both)

2 = inability to perform the activity

(IADL range = 0-10; ADL range = 0-4;

Composite range = 0-14).

Subjects were divided into three functional impairment groups: "low" impairment (composite score of 0-5); "moderate" impairment (composite score of 6-10); or "high" impairment (composite score of 11-14). Mean scores were also calculated for IADL and ADL.

If personal assistance was required, subjects were asked "who helps?" and responses were categorized as "formal" (e.g., social services or other hired personnel) or "informal" assistance (e.g., family, friends, or neighbors).

Social Services Measurement

The number and frequency of social services also affect independent living; more social services are required as functional abilities diminish.

The researcher asked if subjects used any of nine social services: homemakers, home delivered meals, transportation, friendly visitors, telephone reassurance, adult day care, legal assistance, family and personal counseling, and respite care. Based on the number of services, subjects were placed in one of three categories: "low" users (0-1 service); "moderate" users (2-5 services); or "high" social service users (6-9). Mean scores were also calculated from composite scores.

Social Support Networks Measurement

To assess social support networks, the frequency of social contacts was assessed. Subjects were placed into one of two groups: "low" or "high" frequency of social contacts. The researcher asked how often subjects saw or talked to (a) family members, (b) friends, and (c) neighbors: possible responses were once a day or more, a few times a week to weekly, once a month, a few times a year, or never. The number of social contacts were ranked by fre-

quency: 0 = never; 1 = a few times a year; 2 = once a month; 3 = weekly; and 4 = at least once a day. An overall composite score was calculated: 0-7 indicated low frequency and 8-12 indicated a high frequency of social interactions.

Statistical Analyses

Descriptive statistics, chi-square, and *t*-test were used for the statistical analyses to examine the relationships between the variables.

CHAPTER 4

DATA AND RESULTS

Influence on Independent Living

This study explored three specific ways in which the Companion for Life (CFL) home response technology may help individuals to live independently: (a) enhancing factors believed to be necessary for community living such as reductions in risk; (b) perceived availability for emergency utilization; and (c) utilization for socialization. Perceptions represent a subjective component of independent living while actual utilization for emergencies or socialization are more objective elements. The effect of payment systems, functional status, social services, and social support networks on subjects' perceptions and utilization were studied to further probe CFL's effectiveness.

Overall Perceptions and Utilization

Subjects felt that CFL was highly beneficial in facilitating independent living. The primary benefit was the perceived availability of emergency assistance. Overall, 93% of the subjects said the system helped them to live

independently: 65% indicated someone would be available in an emergency; 19% said they would not be dependent on others in a crisis situation; 12% indicated it helped because they lived alone or were lonely; and 4% thought their families felt better (see Table 4). Two subjects replied in the negative: one said the system was not needed; the other indicated the same sense of security could be achieved by dialing 911.

Among all subjects, 93% said having CFL made a difference in their lives: 50% expressed psychological benefits such as "peace of mind," "like having a companion...," "comforting..."; 43% said they felt more independent, "feeling safe like someone's with you...," "secure," "self-confident," "available for burglars, fire and police"; 4% stated family members felt "relieved" and "less burdened" (see Table 5). One person compared CFL to "having a gun, which helps every night." Another felt the unit was not necessary as the individual was "able to get around independently."

Subscribers were asked to rate CFL as "excellent, good, fair, or poor." Overall, 58% rated CFL "excellent" while 42% rated it "good or fair." One person would not say because the unit "had never been used."

TABLE 4
Subscriber Perceptions: How Companion for Life Enhances Independent Living

	Distribution	
	Frequency	(%)
Responses		
Emergency assistance	28	(65)
Independence from others	8	(19)
Helps when alone/lonely	5	(12)
Family feels better	2	(4)
Total	23	(100)

TABLE 5

Subscriber Perceptions: Why Companion for Life Makes a Difference in Their Lives

	Distribution	
	Frequency	(%)
Responses		
Psychological benefits (e.g., peace of mind, comforting)	23	(51)
Feel more independent (e.g., safe, secure)	20	(44)
Reduces family concerns (e.g., relieved, less burden)	2	(4)
Total	45	(99)[a]

[a]Total does not equal 100% due to rounding.

Subscriber motivations, or expected benefits, were anticipated to influence perceptions and utilization. Fully 89% indicated that an event, incident, or change in their lives made them want the system (see Table 6): of these, 90% involved an illness or medical condition (e.g., dizziness, falls, heart problems) and 9% were socially motivated (e.g., death of spouse, living alone, family concerns). Responses strongly suggested medical vulnerability. Anxiety over living alone was a common, recurrent theme.

Subscribers were asked if they had personally chosen the more sophisticated Companion-Voice model. Overall, 41 (89%) said "no": 20% indicated family members made the decision; 51% said social workers; 24% thought installers; and 5% said they did not know. Of the five (11%) who did: two "did not know other models were available"; and three gave affordability and the social component as reasons for CFL preference. Five people indicated they had considered other emergency response systems in the past.

When asked about the voice-to-voice feature, 89% said it made a difference in their lives: half expressed psychological reasons saying the voice made them "feel better," "secure," and "more at ease"; 19% gave social reasons such as "nice when lonely"; and one-third reported they wanted to hear a confirmatory response if they were unable to reach

TABLE 6

Subscriber Responses: Reason for Getting Companion for Life

	Distribution	
	Frequency	(%)
Responses		
Illness/medical condition (e.g., falls, dizziness, heart problems)	38	(93)
Social reasons (e.g., death of spouse, lives alone, family wants it)	3	(7)
Total	41	(100)

the telephone. Others expressed anxiety about the technology; they indicated the voice assured them the system was working.

When subjects were asked if they were wearing the pendant, 59% gave a negative response. Comments included, "don't wear it when near the phone or unit," "always near me," "know right where it is," and "I carry it from room to room and hang it on special hooks." This was a significant finding because effectiveness can be compromised without the pendant on the individual or in very close proximity.

Overall, 22 (48%) subjects said they had used CFL at some time: 68% for genuine emergencies (e.g., falls, illness, intruder) and 32% for accidental activations. Five subjects reported they had used the system more than once and five indicated more than seven occasions. One respondent indicated she had experienced an emergency situation; however, instead of using CFL, she called a relative who summoned paramedics.

No one reported using the system for socialization.

Payment Systems

Differences between the two payment groups were examined to explore their possible influence on perceptions

and utilization. Overall, 22 (48%) subjects paid privately and 24 (52%) were MSSP.

Perceptions and Utilization

There were no differences in perceptions among the two payment groups. Both private (91%) and MSSP (96%) subjects reported CFL helped them to live independently. The perceived provision of emergency assistance was the primary benefit. Both groups said the system made them feel more independent and made a difference in their lives citing psychological benefits and enhanced independence.

In spite of overall satisfaction, there was a difference between private and MSSP subjects which approached significance. Chi-square analysis revealed that MSSP subjects were more satisfied; 17 (71%) gave an "excellent" rating, compared to nine (43%) of the private subjects, $X^2(1, N = 45) = 3.52, p < .10$ (see Table 7).

When asked if they had personally selected the Companion-Voice model, all MSSP subjects indicated that they had not. When asked who did: 21 (88%) said case managers; two (8%) said installers; and one (4%) did not know. Seventeen (77%) of the private subscribers gave a similar response: of these, eight (47%) said installers had

TABLE 7

Satisfaction Ratings and Payment Systems

	Payment Systems					
	Private		MSSP		Total	
	n	(%)	*n*	(%)	*n*	(%)
Ratings						
Excellent	9	(43)	17	(71)	26	(58)
Good/Fair	12	(57)	7	(29)	19	(42)
Total	21[a]	(100)	24	(100)	45	(100)

Note. $X^2(1, N = 45) = 3.52, p < .10$

[a]One respondent answered "cannot say."

selected the unit; eight (47%) said family members; and one (6%) did not know.

On comparison, 82% (private) and 96% (MSSP) agreed the voice-to-voice feature made a difference. Subjects said they "felt better," "secure," and "at ease"; some gave social reasons such as "good to talk to someone when sick" or CFL is "like a friend." Among MSSP subjects, 43% said they "wanted to hear an answer if unable to get to the phone." These respondents did not appear to trust the technology and needed reassurance that the system would function properly.

Chi-square analysis revealed a significant difference in utilization among MSSP and private subjects, $X^2(1, N = 46) = 4.22$, $p < .05$ (see Table 8). Private clients (64%) reported they used CFL more frequently than MSSP (33%). Further examination of users and non-users revealed somewhat higher satisfaction reported by non-users. Among non-users, none said they had participated in the decision to get CFL, suggesting that those who did participate were more likely to use the system.

Although 17% of the MSSP and 5% of private subscribers indicated that the system helped when lonely, no one said they had used CFL for socialization.

TABLE 8

Utilization and Payment Systems

	Payment Systems					
	Private		MSSP		Total	
	n	(%)	*n*	(%)	*n*	(%)
Users	14	(64)	8	(33)	22	(52)
Non-Users	8	(36)	16	(67)	24	(48)
Total	22	(100)	24	(100)	46	(100)

Note. $X^2(1, N = 46) = 4.27, p < .05$

Functional Status

Functional status was assessed by determining impairment levels. There were 14 (30%) subscribers classified as having a "low" level of impairment (range of 0-5); 31 (67%) were "moderately" impaired (range of 6-10); and one (2%) was "highly" impaired (score of 12). No one reported being totally dependent. Overall, subscribers demonstrated minimal to moderate impairment, or conditions which limit performance of normal activities or permit performance but in a longer time.

MSSP subjects (79%) reported greater impairments than private subscribers (59%), although statistical analysis was not significant. However, on comparison of ADL and IADL means, a *t*-test revealed that MSSP subscribers ($M = 6.2$) were significantly more impaired in IADL than private subjects ($M = 4.9$), $t(44) = 2.17$, $p < .05$, but not significantly different in ADL (MSSP $M = .83$; private $M = .55$, n.s.). The former finding was consistent with MSSP case management assessments.

Perceptions and Utilization

Functional status did not influence subscriber perceptions. However, the moderately impaired expressed somewhat

greater benefits; 100% said the system helped with independent living, compared to 85% of those less impaired.

Chi-square analysis revealed a significant difference in satisfaction: 22 (69%) of the moderately impaired rated CFL "excellent" compared to four (31%) of those in the low impairment group, $X^2(1, N = 45)$, $p < .05$ (see Table 9).

There were no significant differences in utilization. In both impairment levels, approximately half of the subjects indicated they had used the system at some time.

Social Services

Based on a scale of 0-9, subjects were categorized as "low," "moderate," or "high" users of social services: 21 (46%) of the subjects were low users; 25 (54%) were classified as moderate users; and there were no subjects in the high use category. The range of social services was from 0 to 4.

As anticipated, *t*-test analysis revealed that MSSP subscribers ($M = 2.79$) employed significantly more social services than private subjects ($M = .682$), $t(44) = 9.93$, $p < .05$. Homemakers, home delivered meals, and transportation were used most often. MSSP clients also indicated that they engaged them more frequently. Subjects reported that friendly visitors, telephone reassurance, and legal services

TABLE 9

Satisfaction Ratings and Impairment Levels

	Impairment Levels					
	Low		Moderate		Total	
	n	(%)	*n*	(%)	*n*	(%)
Ratings						
Excellent	4	(31)	22	(69)	26	(56)
Good/Fair	9	(69)	10	(31)	19	(41)
Total	13	(100)	32	(100)	45[a]	(100)

Note. $X^2(1, N = 45), p < .05$

[a]One respondent answered "cannot say."

were occasionally used; counseling, respite, and day care were not employed at all. Subjects seemed unaware the latter services existed. Respondents indicated personal or family counseling was not necessary because domestic problems were handled within the family. Respite and day care were probably unfamiliar services as most subjects reportedly had no caregivers and formal respite and day care services are not readily available in the community.

As expected, among those needing help, MSSP subjects utilized significantly more formal assistance with ADL's (M = .708) than private subscribers (M = .318), $t(44)$ = 2.21, $p < .05$. The former also utilized more formal assistance on IADL's (MSSP M = 1.625) than the latter (Private M = .909), $t(44)$ = 2.50, $p < .05$. These findings may be due to the provision of formal services by MSSP. They may also be due to the absence of informal help for MSSP subjects. Both groups said they utilized informal services (family and friends) for traveling, assistance with finances, and grocery shopping, which may be a reflection of the personal nature of the activities or that services are not available for this type of activity.

Perceptions and Utilization

Fully 100% of those in the moderate services category and 90% of those in the low services category said the system helped them to live independently. There were no other differences in subscriber perceptions.

Virtually all subjects in the moderate services group and 76% of those in the low use category said someone else had selected the system for them. When questioned about the voice feature, 96% of the former said it made a difference in their lives compared to 81% in the latter group.

There was a significant difference in subjects' satisfaction with the system. Chi-square analysis revealed that those with more social services were more satisfied: 18 (72%) of the moderate users rated the system "excellent" compared to eight (40%) of the low users, $X^2(1, N = 45) = 4.66$, $p < .05$ (see Table 10).

Those with more services (60%) also indicated they used the system more often than the low services group (43%).

Social Support Networks

As a whole, CFL subjects were not socially isolated. However, 18 (39%) subjects had a low frequency of social

TABLE 10

Satisfaction Ratings and Social Service Utilization

	Social Services					
	Low Use		Moderate Use		Total	
	n	(%)	*n*	(%)	*n*	(%)
Ratings						
Excellent	8	(40)	18	(72)	26	(58)
Good/Fair	12	(60)	7	(28)	19	(42)
Total	20	(100)	25	(100)	45[a]	(100)

Note. $X^2(1, N = 45) = 4.66, p < .05$

[a]One respondent answered "cannot say."

contacts (range of 1-7) while 28 (61%) had a high frequency of contacts (range of 8-12).

Overall, 67% indicated that they saw or talked to a relative, friend, or neighbor at least once a day. Subjects appeared to be both initiators and recipients of the interactions. Two subjects expressed appreciation for family concern and help. Two felt neighbors were "very helpful" or "like family." Three subscribers said they had no family. Three subjects said their friends had predeceased them; one respondent felt friends and family had abandoned him when he became incapacitated. Three indicated it was better to "keep one's distance" as they were raised "not to mingle with neighbors" or "did not want to become a nuisance."

Perceptions and Utilization

There were no significant differences in the perceptions of the two social contact groups. However, there were several interesting patterns. When asked if something had happened to make them want a system, 78% of those with a low frequency of social contacts said "yes" compared to 96% of those with more interactions. It was expected that those with fewer social contacts would want the system. Additionally, those who socialized more frequently said they were more satisfied.

Those with fewer contacts (56%) indicated they used CFL more often than the high contact group (43%). This may indicate that those with no other recourse tend to use the system more.

None of the subjects at risk of social isolation (33%) reported using CFL for socialization. This finding suggests underutilization of at least one key feature of the system. In fact, one participant did not use the social component because she felt responders "are busy and should not be bothered."

Summary

Overall, CFL subject responses indicated they were moderately impaired, were moderate users of social services, and the majority were not socially isolated. Subjects perceived CFL as highly effective in enhancing independent living. Perceptions did not appear to be related to the modifying variables. Significant differences were found in reported satisfaction with the CFL system. Few subjects actually used the system most probably for lack of a reason. The social component could not be evaluated since none of the subjects reported using CFL for socialization.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

Discussion

There were several limitations to the research which must be addressed. The evaluation examined only a single intervention and one level of service, the Companion for Life Companion-Voice model. The results cannot be generalized to subscribers of all home response systems due to the small, relatively homogeneous sample.

The sample was limited to English-speaking subscribers. The results cannot be generalized to the elderly population as a whole without considering cultural and language factors.

There were no experimental or control groups. Therefore, it was difficult to clearly distinguish the effects of the home response system on independent living from the influence of other factors.

The effect of home response technology over time could not be established as this was a cross-sectional, rather than a longitudinal study.

The data are based on self-reported responses. It has been found that people tend to overrate their functional status (Gallo, et al., 1988).

Finally, the ability to live independently is not dependent on any single intervention or life circumstance. Home response systems are one of many services designed to facilitate independent living. The conclusions reached in this study are limited to the perceived influence of a single intervention.

Subscriber Perceptions

Subscribers thought CFL made a very effective contribution to independent living. Overall, respondents expressed a high level of satisfaction with the system and said it made a difference in their lives.

The majority of subscribers were motivated to get the system after experiencing medical and environmental emergencies and CFL's primary benefit was the perceived and actual provision of 24-hour emergency assistance. The data clearly indicate that subscribers experienced an increased sense of safety, security, and peace of mind as a result of having the system. Subjects felt that CFL reduced the risks of living alone. These findings are consistent with previous research.

There was evidence that some subjects mistrusted the technology; however, this mistrust did not influence the overall positive nature of their perceptions. The mistrust may be an expression of a cohort effect since many elders are unaccustomed to technological devices. The wariness may be because the technology is relatively new or due to lack of training or information about operation of the system.

CFL appeared to provide an active rather than passive means of facilitating independence which resulted in significant psychological benefits. Subjects described an increased sense of self-sufficiency and independence. A sense of control over one's life is a vital component of independent living. Perceived control is a coping mechanism for stressful situations which refers to control over the environment, life events, and both causing intended events or avoiding unintended events as a result of one's own actions (Rodin, 1986; Rotter, 1966; Shupe, 1985). Control affects emotional status, performance, and subjective well-being. It has been positively correlated with the psychosocial measures of self-concept, self-contentment, and better life adjustment and negatively correlated with depression (Abler & Fretz, 1988; Crewe, 1979; Guarnera & Williams, 1987; Hickson, Housley, & Boyle, 1988; Langer & Rodin, 1976; Reid, Haas, & Hawkings, 1977; Rowe & Kahn,

1987). Although perceived control was not a variable in this study, the findings imply reciprocal enhancement between independence and perceived control as a result of home response technology: control was increased by enhancing independence and independence can influence control.

There were no significant differences in subscriber perceptions upon examination of the modifying variables except in satisfaction: MSSP subjects, those more functionally impaired, and those who used more social services were significantly more satisfied with CFL. There are several possible explanations for these differences. For MSSP subjects, greater satisfaction may have been a "halo effect" resulting from familiarity with outside social services. The difference may not be due to the payment sources per se but to service use. It may be that MSSP subjects with acknowledged vulnerability felt the system was more helpful. Private clients, who were somewhat more independent, may not be as satisfied because they perceive less of a need for the system. Those more functionally impaired may perceive the system as a coping mechanism and like CFL more.

MSSP subjects used significantly more formal assistance with ADL's and IADL's. The disparity in social service use may be due, in part, to MSSP participation. The program arranges for and provides formal assistance as part of its

case management function. On the other hand, private subscribers may perceive themselves as more independent. Additionally, private subjects had more informal supports available. An unintended benefit, the "security effect," may apply (Dibner, 1981); private subjects could be motivated to employ fewer services due to increased confidence as a result of having the CFL system. However, this could not be substantiated in this study.

The majority of subjects reported that someone else chose the Companion-Voice model for them, potentially challenging their autonomy. However, the data could not substantiate this. Subscribers who discontinued the service may not have been involved in the initial decision-making process, but this is not known. Only one person, whose relative ordered the system, was thinking of having it removed because she "did not need it." None of the other respondents expressed unhappiness about having the technology. However, out of respect for their autonomy and to maximize the technological benefits, subscribers must fully understand and accept home response systems (Butler, 1981). Discussion and participation in the choice of a system is important. It may be that if given the choice, elders may not perceive a need for home response technology, preferring instead some other intervention.

Utilization

Overall, 15 subjects had used the system for either medical or environmental emergencies. There was a significant difference in utilization between private and MSSP subjects: the former used the system more often. It may be that systems are more useful for those who are less impaired and need only minimal help. Those who pay for their systems might utilize them more; however, the data could not substantiate this. MSSP subscribers, with a larger number and higher frequency of social services, may not need the system. Among MSSP subjects, none had participated in choosing the system, suggesting those who do participate may be more likely to use it.

There was evidence that, even when warranted, subscribers do not always use the system. One individual called a relative rather than use CFL for an emergency. The low utilization rate may be due, in part, to the fact that subjects experienced few emergencies. However, the researcher communicated with a CFL staff member following a major earthquake (7.1 magnitude on the Richter scale) which occurred two months after the research was completed. On questioning, the staff member reported that none of the subscribers attempted to use the system during or after the disaster. Moreover, nearly 60% of the subjects were not

wearing the pendant at the time of the interview, which may imply a false sense of security. It is not known if subscribers do not realize the dangerous consequences of not having the pendant available, misunderstand how the system operates, or simply do not like wearing the pendant.

Subjects did not use CFL for socialization even though they all had the feature and 17% of the MSSP subscribers said they wanted the social component because they felt lonely or lived alone. This may be a cohort effect of avoiding inconvenience to others including the central responders. Subjects may have forgotten the system has the socialization capability. The social component may not be necessary for this particular sample, but its availability may contribute to the sense of security.

Implications and Recommendations for Future Research

The researcher examined the perceptions of independence and independent living maintained by elders and, indirectly, those factors perceived as a threat to independence. These insights are essential for the planning, development, and evaluation of interventions designed to facilitate community living. These findings also have implications for the formation of public policy because community services are

increasingly important for the growing population of elders preferring to live independently.

Further research is recommended to thoroughly evaluate the effectiveness of home response technology.

"Independent living," and "prevention," "deferment," or "delay" of institutionalization need to be operationally defined and measurement criteria standardized. These variables need to be measurable to adequately assess the efficacy of home response technology. Operationalization of these concepts would also be helpful in the evaluation of other interventions.

The use of experimental and control groups in conjunction with pre- and post-tests would be helpful for comparisons of independence, expected benefits, and perceptions prior to and after systems are installed. The data would help to substantiate differences in independence attributable to home response systems.

Longitudinal studies examining the technology's influence over time would be beneficial in further evaluating actual utilization.

Unintended consequences and secondary effects need to be examined. Home response technology may result in a "backlash" or negative outcome such as declines in socialization. Self-esteem may suffer if elders using home

response systems are labeled "dependent." However, the secondary consequences may also be beneficial. For example, caregivers may perceive a reduction in burden and decide to delay institutionalization.

Caregiver attitudes and perceptions toward home response technology should be studied because of their role in the institutional placement of older persons. It is important to know how caregivers and other concerned individuals perceive the technology, why they want it, and under what circumstances they encourage getting it. Studies of this type would also facilitate the development and implementation of other home response programs. The studies would have both direct and indirect implications for elders.

Comparisons of the different home response systems would be helpful. Moreover, data and expertise should be shared to improve the technology and to expand availability for others who may benefit from the intervention.

Presently, home response services are provided primarily in English. However, potential utilization studies among individuals of different ethnic or cultural backgrounds would be beneficial. A number of the culturally diverse elders and their families may need home response services.

Conclusions

The purpose of the research was to explore the efficacy of the CFL home response system in enhancing independent living for elders. Using telephone interviews, the researcher examined subscriber perceptions of CFL's effectiveness and actual utilization for emergencies and socialization. Modifying variables of payment sources, functional status, social services, and social support networks were studied to investigate their influence on subscriber perceptions.

Equipment use and effectiveness have been emphasized in previous research on this topic. This researcher focused on older subscriber perceptions of the influence of home response technology on independent living.

Overall, the sample consisted of elders who were moderately impaired, employed a moderate number of social services, and were not socially isolated.

The findings indicated that subjects perceived CFL as highly influential in contributing to independent living. Subjects felt CFL's primary benefit was the perceived provision of 24-hour emergency assistance. CFL reduced the risks associated with living alone. However, the immediate benefits were psychological in nature. The technology augmented peace of mind and led to reductions in anxiety. By increas-

ing subscriber independence and control there is implied enhancement of quality of life.

It is noteworthy that almost 60% of the subjects were not wearing the pendant when interviewed. The underlying rationale for this finding is not clear. Failure to wear the pendant may indicate a false sense of security or that the mere presence of the system is a substantial benefit for subscribers.

In the analysis of the modifying variables, there were two significant findings. There were significant differences in satisfaction upon examination of three of the modifying variables. Those who were MSSP subscribers, those who were more impaired, and those who employed more social services were more satisfied with the system.

Analysis of the payment groups revealed a significant difference in utilization. Private clients, who were less impaired, used fewer social services, and had more social contacts used the system more often. On further comparison of users and non-users, none of the non-users participated in choosing the system, suggesting that those who do may be more likely to use it. Although definitive reasons for the findings could not be ascertained, several possible explanations were considered. Further research would be helpful in explaining the distinctions.

Utilization for socialization could not be evaluated; none of the subjects reported using CFL for this purpose even though several subscribers explicitly said they wanted the system because they were lonely or lived alone. Simply having the feature available may be a sufficient benefit.

The study provided a critical evaluation of CFL home response technology in a natural setting. The researcher was able to explore the entire role CFL plays in the lives of this particular elder population beginning with the impetus for getting the system, the perceived and actual benefits, and its appropriateness as an intervention for independent living.

Independent living is thought to be possible for the majority of seniors if adequate resources and community services are available. For the elders who participated in this study, the CFL home response system was highly effective in enhancing independent living. However, one must remember that home response technology is but a single intervention among a wide range of services designed to facilitate independence for older persons. With thorough evaluation and proper implementation, Companion for Life can be a very effective intervention to help elders maintain community living.

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APPENDIX A

CONSENT TO CONDUCT THE STUDY

COA COUNCIL ON AGING

OF SANTA CLARA COUNTY, INC. • 2131 THE ALAMEDA • SAN JOSE, CA 95126 •
(408) 296-8290

[79]

April 11, 1989

San Jose State University
Institutional Review Board
Human Subjects Protocol for Research
One Washington Square
San Jose, CA 95192

Attention: Review Board

I wish to notify the Institutional Review Board-Human Subjects Protocol for Research, that the Council on Aging has granted permission and supports the study of its Companion for Life Program. The study is being undertaken by Nancy Nobuye Hikoyeda. The name of the protocol is An Evaluation of a Home Response System.

Respectively,

Stephen M. Schmoll

Stephen M. Schmoll
Executive Director

APPENDIX B

APPROVAL FROM THE COMMITTEE

FOR THE PROTECTION OF HUMAN SUBJECTS

SJSU SAN JOSE STATE UNIVERSITY

A campus of The California State University

Office of the Academic Vice President • *Associate Academic Vice President* • *Graduate Studies and Research*
One Washington Square • San Jose, California 95192-0025 • 408/924-2480

June 26, 1989

Nancy Hikoyeda
3331 Mira Vista Court
San Jose, CA 95132

Dear Nancy:

Your human subjects protocol number 7493 has received final approval. Attached is a copy of the final approval form with the signature of the Chairman of the Human Subjects Institutional Review Board and my approval.

The Human Subjects Institutional Review Board must be notified in writing of any changes to this approved protocol, and approval must be granted in writing before any change is instituted.

Congratulations and good luck with your research!

Sincerely,

Serena Stanford

Serena Stanford, Ph.D.
AAVP for Graduate Studies & Research

Attachment

APPENDIX C

LETTER OF INTRODUCTION

COA COUNCIL ON AGING

OF SANTA CLARA COUNTY, INC. • 2131 THE ALAMEDA • SAN JOSE, CA 95126 •
(408) 296-8290

[83]

Dear

The Council On Aging of Santa Clara County, Inc. (COA), is requesting that you participate in an interview regarding your involvement as a subscriber in the "Companion For Life" program. The purpose of this interview is to find out how well this program is working and whether or not improvements could be made to provide you with better service.

The interview will take approximately 45 minutes and will be conducted by phone. Ms. Nancy Hikoyeda will be calling you within the next week to determine your interest and willingness to participate. Your "Companion For Life" service will not be affected, whether or not you participate in this survey and the results of this survey will be kept strictly confidential.

I hope that you will participate in this important study. Should you have any questions, please do not hesitate to call me, Nancy Hikoyeda or Paul Isaacs at the Council On Aging, (408) 296-8290.

Thank you for your cooperation.

Sincerely,

Stephen M. Schmoll
Executive Director

APPENDIX D

INSTRUMENT

INTERVIEW GUIDE:

INTRODUCTION, SELECTION AND CONFIDENTIALITY

A. Hello, Mr./Mrs. _____. My name is Nancy Hikoyeda and I am calling about the evaluation of your Companion for Life home response system. Steve Schmoll of the Council on Aging recently sent you a letter introducing me. You should have received it by now. (If no, go to Paragraph 1, below.)

B. I would greatly appreciate your help in this study. Your cooperation is voluntary and all your answers are confidential. Your service will not be affected in any way, whether or not you consent to be interviewed.

C. Is this a convenient time to talk to you?

---

1. Purpose/Use: The interview will take about 20 minutes. It is called Evaluation of a Home Response System and it will help the Council on Aging to learn your feelings about your system. We would like to hear your suggestions for any improvements. I will also ask some questions about yourself, to help learn more about the people who have the system. (Go back to Paragraph B above.)

2. How did you get this number? Randomly chosen from among the Council on Aging Companion for Life files.

3. Who is conducting the survey? I am a graduate student at San Jose State University who has received a grant to conduct this study for the Council on Aging. It is called Evaluation of a Home Response System.

I.D. Number _____

EVALUATION OF A HOME RESPONSE SYSTEM

Date of Interview _____/_____/_____
Time started _____ am/pm
Time ended _____ am/pm

Model:
1 Companion Service
2 Call Light 330
3 Call Light 440
4 Companion Voice

As explained in Mr. Schmoll's letter, I would like to ask you some questions about your Companion for Life emergency response system.

---

1. Who told you about Companion for Life?

1 Advertisement (radio, newspaper, ad)
2 Social services (case manager, social worker, senior center)
3 Health professional (hospital, doctor, patients, nurse)
4 Organization (senior center, church, club)
5 Family (relative)
6 Don't know/No response
7 Other/Comments

2. Was there a specific event, incident or change in your life that made you want an emergency response system?

1 No (Go to Q 3)
2 Yes (Skip to Q 4)
3 Don't know/No response

3. (If no) why did you decide to get one?

4. (If yes) what happened?

1 Illness (dizziness, heart problems, unconsciousness)
2 Emergency (fire, burglar, safety, fell, accident)
3 Death of spouse (caregiver, partner)
4 Don't know/No response
5 Other/Comments

5. Does it make a difference having it?

1 No (Go to Q 6)
2 Yes (Go to Q 6)
3 Don't know/No response

6. Please explain. (Tell me more.)

1 Psychological reasons (peace of mind, less worry, feel better)
2 Feel independent (mobility, security, self-confidence/reliance)
3 Family concerns (relationship, burden, independence)
4 Do not need it
5 Don't know/No response
6 Other/Comments

The next questions ask your feelings about your system.

---

7. Did you consider getting any other emergency response system?

1 No (Skip to Q 9)
2 Yes (Go to Q 8)
3 Did not know others were available
4 Don't know/No response

8. (If yes) why did you get Companion for Life?

1 Features
2 Cost
3 Recommended by others
4 Someone else got it for me
5 Don't know/No response
6 Other/Comments

Your model is called:

1 Companion Service (console, pendant)
2 Call Light 330 (C + P) [patient down]
3 Call Light 440A (C + P)
4 Companion Voice (C + P + voice to voice)

9. Did you personally choose this model?

1 No (Go to Q 10)
2 Yes (Skip to Q 11)
3 Don't know/No response

10. (If no) who did?

1 Family member
2 Social worker
3 Friend, neighbor
4 Don't know/No response
5 Other/Comments

11. (If yes) why did you choose this particular model?

1 Did not know about other models
(DO NOT CONTINUE)
2 Cost
3 Recommendation (reputation)
4 Options/features
5 Don't know/No response
6 Other/Comments

(ASK ONLY FOR LEVEL 4 - GO TO Q 14)

12. **Does it make a difference having the voice to voice feature available?**

    1 No (Skip to Q 14)
    2 Yes (Go to Q 13)
    3 Don't know/No response

13. **(If yes) why do you feel it makes a difference?**

14. **How do you rate Companion for Life overall?** (READ LIST)

    1 Excellent
    2 Good
    3 Fair
    4 Poor
    5 Don't know/No response

15. **Do you feel Companion for Life helps you to live independently?**

    1 No (Go to Q 18)
    2 Yes (Skip to Q 19)
    3 Don't know/No response

16. **(If no) why not?**

17. **(If yes) explain how.**

Now, I am going to ask some questions about your use of CFL.

---

18. **Have you ever used your Companion for Life system for any reason?**

    1 No (Skip to Q 27)
    2 Yes (Go to Q 21)
    3 Don't know/No response

19. Please tell me what happened the last time you used your system? (Why did you use it?)

1 Illness (heart problem, dizziness, unconscious)
2 Emergency (fell, fire, vandals/burglars)
3 Accidentally activated
4 Locked out of home
5 Confusion
6 Lonely (for company)
7 Don't know/No response
8 Other/Comments

20. Did you activate the signal or did someone else?

1 I did
2 Someone else did
3 Don't know/No response

21. Have you used it at any other times?

1 No (Skip to Q 25)
2 Yes (Go to Q 24)
3 Don't know/No response

22. (If yes) how many times have you used it?

1 1 - 3 times
2 4 - 6 times
3 More than 7 times
4 Don't know/No response

23. Were there any times when it did not work right?

1 No (Skip to Q 27)
2 Yes (Go to Q 26)
3 Don't know/No response

24. What happened?

25. **What do you like about the service and equipment?**

1 Console
2 Pendant
3 Cost
4 Service by responder
5 Service by COA
6 All of the above
7 Don't know/No response
8 Other/Comments

26. **Is there anything you do not like about the service or equipment?**

1 Console (size, appearance, location)
2 Pendant (size, style, convenience, weight, range, wearing it)
3 Cost (no insurance coverage, too expensive)
4 Service by responder (prompt, friendly)
5 Maintenance service by COA
6 Fear it won't work (long distance, technology)
7 Don't know/No response
8 Other/Comments

27. **Is there anything you would like to change?**

1 No (Skip to Q 31)
2 Yes (Go to Q 30)
3 Don't know/No response

28. **(If yes) what changes would you like made?**

1 Console
2 Pendant
3 Responder in central office
4 Service by COA
5 Cost
6 Don't know/No response
7 Other/Comments

The next set of questions ask about installing the system in your home.

---

29. During installation, was there anything you did not understand?

1 No (Skip to Q 33)
2 Yes (Go to Q 32)
3 Don't know/No response

30. (If yes) please explain.

31. Did the installers answer all your questions?

1 No (Go to Q 34)
2 Yes (Skip to Q 35)
3 Don't know/No response

32. (If no) what questions did you have?

33. Do you have any suggestions for improving installation?

1 No (Go to Q 37)
2 Yes (Go to Q 36)
3 Don't know/ No response

34. (If yes) what suggestions do you have?

35. Do you ever check the system to make sure it is working?

1 No (Skip to Q 39)
2 Yes (Go to Q 38)
3 Don't know/No response

36. How often do you check?

1 Daily
2 Weekly
3 Monthly
4 Don't know/No response
5 Other/Comments

37. Are you wearing your pendant now?

1 No
2 Yes
3 Don't know/No response

These questions ask about the support people you listed. They are the people to notify whenever your Companion for Life is activated.

---

38. Is (1) _____

1 Relative
2 Friend
3 Neighbor
4 Don't know/No response

39. What does he/she think of CFL?

40. Is (2) _____

1 Relative
2 Friend
3 Neighbor/Acquaintance
4 Don't know/No response

41. What does he/she think of CFL?

42. Is (3) _____

1 Relative
2 Friend
3 Neighbor/Acquaintance
4 Don't know/No response

43. What does he/she think of CFL?

Now, I would like to ask a few questions about yourself because we are interested in knowing more about the people who have CFL. I am going to read a list of things that people usually do. Please tell me whether you are able to do it by yourself or with some kind of help or not at all.

44. Are you able to go shopping? (groceries, clothes)

1 Does not shop
2 Accompanied on all shopping trips (Go to Q 47)
3 Shops only for small purchases without help
4 Can do most by yourself without help
5 Don't know/No response

45. Who helps?

46. Are you able to do light and heavy housework? (cleaning, laundry)

1 Gets help with all housework
2 Gets help with some light housework (Go to Q 49)
3 Does all light housework with help
4 Does all housework without help
5 Don't know/No response

47. Who helps?

48. Are you able to travel anywhere? (store, visiting)

1 Does not travel
2 Travels only in taxi, private auto, or public transportation and always needs help (Go to Q 51)
3 Never needs help even when traveling on public transportation
4 Drives own automobile
5 Don't know/No response

49. Who helps?

50. Are you able to handle your own money? (write your own checks, pay bills)

1 Does not handle any money
2 Handles money with some help (Go to Q 53)
3 Handles money without any help
4 Don't know/No response

51. Who helps?

52. Are you able to walk around? (house, yard, block)

1 By yourself
2 With some help such as a cane, walker or crutches
3 With quite a bit of help such as from another person (Go to Q 55)
4 Does not walk
5 Don't know/No response

53. Who helps?

54. Are you able to shower or bathe?

1 Cannot bathe or shower at all (must have bed bath)
2 With someone to help get in and out of the tub/shower (Go to Q 57).
3 By yourself
4 Don't know/No response

55. Who helps?

56. Are you able to dress yourself? (pick out your own clothes, buttoning, zipping)

1 With quite a bit of help (Go to Q 59)
2 With a little help (Go to Q 59)
3 By yourself
4 Cannot manage at all
5 Don't know/No response

57. Who helps?

Now, I would like to ask about people who call or visit you.

How often do you see or talk to: (Do not circle response.)

1	Once a day or more	4	Once a month or more
2	Few times a week	5	Few times a year
3	Weekly	6	Never

58. Family/Relatives .....

59. Friends .....

60. Neighbors .....

61. Does your family know about CFL? If so, what do they think of it?

62. Do your friends know about CFL? If so, what do they think of it?

63. Do your neighbors know about CFL? If so, what do they think of it?

The last questions concern services you may be receiving. Please tell me if you receive these senior services and, if so, how often.

	1 No 2 Yes	3 How Often
64. Homemaker ..... (Cleaning, chores, laundry)		
65. Home delivered meals ..... (Meals-on-Wheels)		
66. Transportation ..... (Van, Medi-Car, O & E)		
67. Friendly visitor ..... (Regularly come to home)		
68. Telephone reassurance ..... (CFL or others)		
69. Adult Day Care ..... (Spend day somewhere)		
70. Legal Assistance.....		
71. Counseling ..... (Personal or family problems)		
72. Respite care..... (Person helping needs a break)		

We are finished with the interview. I appreciate your time and cooperation. You have been very helpful and the information will be very useful. Thank you.